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EXAMINER

ARNOLD JR, JAMES

ART UNIT PAPER NUMBER

1764

DATE MAILED: 08/27/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/897,757

Applicant(s)

DIDILLON ET AL.

Examiner

James Arnold, Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-19 and 21-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-19 and 21-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 14-19, 21-24 and 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haun (USPN 5,114,562) in view of Sawyer (ep-0 419 266).

The Haun reference discloses a process comprising a stage in which the sulfur-containing compounds present in the catalytic cracking gasoline are at least partially transformed into H₂S and into saturated sulfur-containing compounds in a reactor. See column 2, lines 59-68 and Column 3, lines 1-17. The reference also discloses a second stage of separating H₂S from the gasoline produced in the first stage. See column 2, lines 59-68 and Column 3, lines 1-17. The reference discloses a process whereby stage A is carried out by passing the feedstock, in the presence of hydrogen, over a catalyst comprising at least one element selected from the group consisting of at least one element of Group VIII and at least one element of Group VIB. See

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Column 2, lines 59-68 and Column 3, lines 1-17. The reference discloses the use of nickel and cobalt as the Group VIII metals and molybdenum and tungsten as the group VIB metals.

Column 2, lines 59-68 and column 3, lines 1-17. The reference discloses desulfurization reaction zone temperatures ranging from 204-649C, pressure between about 400 psi to 3,500 psi (2.76 Mpa to 24.13 Mpa), and volumetric flow rate of liquid between 0.2 hr^{-1} to 6.0 hr^{-1} . The Haun reference discloses a process wherein the catalyst for stage A is different from the catalyst for stage B. See Column 2, lines 59-68 and Column 3, lines 1-17. The Haun reference discloses a catalyst comprising at least one metal of nickel, cobalt, molybdenum, tungsten, or iron. See Column 11, lines 30-56 and Column 15, lines 50-65.

The Haun reference does not disclose a third stage (stage C) in which saturated sulfur-containing compounds remaining in the gasoline are at least partially transformed into H_2S . The reference does not disclose a pretreatment stage, before stage A, comprising hydrogenating diolefins in the feedstock. The reference does not disclose the use of catalysts in the sulfide form. The reference does not disclose a stage A process utilizing an H_2/HC ratio of between about 100 and about 600 liters. The reference does not disclose a process wherein stage C is carried out in the presence of a catalyst comprising at least one base metal selected from the group consisting of nickel, cobalt, iron, molybdenum, and tungsten. The reference does not disclose a process whereby the base metal content is between 1 to 60% by weight, and said metal is sulfurized. The reference does not disclose a stage C process carried out at a temperature of between about 200 C and about 350 C, a pressure of between about 0.5 and 5 Mpa, a liquid volumetric flow rate between about 0.5 h^{-1} and 10 h^{-1} , and an H_2/HC ratio of between about 100 and about 600 liters per liter. The reference does not disclose a reactor possessing a catalyst for stage

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C. The reference does not disclose a process wherein stage B for the elimination of H₂S is carried out by adsorption in the presence of an adsorbent mass selected from the group consisting of zinc oxide, copper oxide, and molybdenum oxide. The reference does not disclose a process wherein H₂S is separated using a membrane. The reference does not disclose an H₂/HC ratio of 200-600 liters per liter.

Sawyer discloses the use of sulfided group VIII and group VIB catalysts. See Page 4, lines 19-25.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a third stage (stage C) in which saturated sulfur-containing compounds remaining in the gasoline are at least partially transformed into H₂S because hydrogenation of hydrocarbons as disclosed by Haun would naturally result in the formation of H₂S. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a pretreatment stage, before stage A, comprising hydrogenating diolefins in the feedstock because the application discloses production of H₂S through hydrogenation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize catalysts in the sulfide form because the Sawyer reference discloses the sulfided form of Group VIB and Group VIII metals as effective hydrotreatment tools and the application claims the use of Group VIB and Group VIII metals as catalytic components. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a stage A process utilizing an H₂/HC ratio of between about 100 and about 600 liters because Haun discloses the use of hydrogen in the hydrodesulfurization process and it would be appropriate to use hydrogen in any amount effective for hydrotreating. It would have been

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obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein stage C is carried out in the presence of a catalyst comprising at least one base metal selected from the group consisting of nickel, cobalt, iron, molybdenum, and tungsten because these metals are part of the catalyst used in the first stage to transform sulfur containing compounds into H₂S. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process whereby the base metal content is between 1 to 60% by weight, and said metal is sulfurized because the base metal is disclosed by the Haun reference and it would be appropriate to use it in any weight percent effective for hydrotreating and because sulfurization of the base metals are disclosed as effective hydrotreaters in the Sawyer reference. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a stage C process carried out at a temperature of between about 200 C and about 350 C, a pressure of between about 0.5 and 5 Mpa, a liquid volumetric flow rate between about 0.5 and 10 h⁻¹, and an H₂/HC ratio of between about 100 and about 600 liters per liter because these are temperatures, pressures, liquid volumetric flow rates, and H₂/HC ratios utilized in the first stage to transform sulfur containing compounds into H₂S. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a reactor possessing a catalyst for stage C because a reactor possessing a catalyst for the first stage is disclosed in order to transform sulfur containing compounds into H₂S. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize an H₂/HC ratio of 200-600 liters per liter because an increased utilization of hydrogen creates greater opportunities for hydroprocessing.

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Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haun (USPN 5,114,562) in view of Sawyer (ep-0 419 266) as applied to claims 14-24 and 27-31 above, and further in view of Robinson (USPN 4,925,549).

Robinson discloses a process wherein the elimination of H₂S is carried out by adsorption in the presence an adsorbent mass selected from zinc oxide and molybdenum oxide or by other membranes. See column 3, lines 30-40.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein stage B for the elimination of H₂S is carried out by adsorption in the presence of an adsorbent mass or membrane selected from the group consisting of zinc oxide, copper oxide, and molybdenum oxide and a process wherein H₂S is separated using a membrane because the Robinson reference discloses the use of a sorbent mass for elimination of H₂S and copper, as a transition metal, has similar properties to zinc and molybdenum.

Response to Arguments

Applicant's arguments have been fully considered but are deemed unpersuasive. Applicant asserts that the combination of references does not teach or suggest an H₂/HC ratio between about 100 and about 600 liters and that there is no motivation to utilize the claimed ratio. This however is not the case because the Haun reference generally discloses the transformation of sulfur containing compounds utilizing hydrogen. The submitted declaration has been fully considered but is considered unpersuasive because it is obvious that an increase in the amount of hydrogen utilized will affect the degree of hydrotreatment. Therefore the

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Examiner maintains that applicant's invention as claimed would have been obvious to one having ordinary skill in the art at the time the invention was made.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

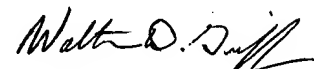
Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Arnold, Jr. whose telephone number is 703-305-5308. The examiner can normally be reached on Monday-Thursday 8:30 AM-6:00 PM; Fridays from 8:30 AM-5:00 pm with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

ja
August 25, 2003


Walter D. Griffin
Primary Examiner